CLAIMS

1. An intensity modulated optic fiber temperature switching immersion probe for remote sensing of temperature, said device comprising:
   (a) a Y-shaped optical fiber light guide encased in a metallic sleeve(8) terminated with a metallic end cap (1);
   (b) the Y-guide having a source arm (2), detector arm (10), a Y-coupler (3), a common arm (9) and a common end cap(4);
   (c) a light source is coupled to the source arm;
   (d) a photo-detector is aligned to the detector arm;
   (e) the Y-guide fits into the common end cap (4) of the metal sleeve;
   (f) an evacuated cell (6) containing a chemical is attached to the common end of Y-guide as means for sensing temperature;
   (g) the cell having a aluminum coating on the outside of the bottom surface forming a concave mirror;
   (h) the cell is covered with a glass plate (5)on the upper side;
   (i) the cell is further bonded and coupled to the metal sleeve by means of a metallic ring(7); and
   (j) a power meter for the processing of electrical signal;
2. The device according to claim 1, wherein the Y-shaped optic guide is encased in a crush resistant metallic sleeve.
3. The device according to claim 1, wherein the optical fiber is made of dielectric material that is non-corrosive, durable and immune to any Electro Magnetic Interference (EMI) and RFI.
4. The device according to claim 1, wherein the light source is white light.
5. The device according to claim 1, wherein the detector arm that is coupled to a photo-detector is connected to signal processing electronic circuitry and an output display.
6. The device according to claim 1, wherein the chemical used undergoes phase

transformation from solid to a liquid phase at its melting point.

7. The device according to claim 1, wherein the chemical is selected from oxalic acid, sodium chloride, paraffin wax and preferably acetamide.
8. The device according to claim 1, wherein the chemical is non-toxic, non-corrosive non- conductive and non-inductive in nature and non-inflammable.
9. The device according to claim 1, wherein in solid state the chemical is opaque to light and emits a fixed value of optical output and with the increased temperature the chemical melts and becomes transparent thus generating an increased optical output.
10. The device according to claim 1, wherein the phase transformation at the melting point of the chemical increases the optical output that is used as a detector signal for actuation of alarm or relay.
11. The device according to claim 1, wherein the length of the cell is twice the focal length of the concave mirror.
12. The device according to claim 1, wherein the optical signal propagation is secure and without any cross talk or interference problems.
13. The device according to claim 1, wherein the optical signal is unaffected by the presence of electrical signals.
14. The device according to claim 1, wherein the said probe is used for remote sensing of temperature upto a distance of 1 km.
15. The device according to claim 1, wherein the said probe at an increased temperature provides an increase of 6 times in the output signal over the signal at the room temperature.
16. The device according to claim 1, wherein said optical probe operates at the melting temperature of the chemical that is in the range of 75-85 ^{0}C.
17. The device according to claim, wherein said optical probe is used in monitoring temperature in hostile, inflammable, corrosive and electro-magnetically noisy environments, preferably in petrochemical industries and power plants.
18. A method of sensing temperature through intensity modulation of light signal using

an intensity modulated and remote sensing optic fiber temperature switching immersion probe, said method comprising the steps of:

(a) immersing the probe in a liquid container having a temperature below the melting point of the chemical;

(b) recording a fixed value of optical signal generated by the chemical in solid state and at the room temperature; and

(c) detecting the maximum optical signal generated by the chemical at its melting point and in liquid phase;

(d) detecting the optical signal be means of a photo-detector;

(e) signal processing by means of an electronic circuitry; and

(f) enabling actuation of a relay to stop the heating process or raise an alarm.

19. The method according to claim 18, wherein the liquid is selected from the group consisting of water, acetone, carbon tetrachloride and transformer oil.

20. The method according to claim 18, wherein the chemical is selected from selected from oxalic acid, sodium chloride, paraffin wax and preferably acetamide.

21. The method according to claim 18, wherein the chemical having a melting point in the range of 75-85 ^{0}C.

22. The method according to claim 18, wherein the optical signal propagation is secure and without any cross talk or interference problems.

23. The method according to claim 18, wherein the optical signal is unaffected by the presence of electrical signals.

24. The method according to claim 18, wherein the said probe is used for remote sensing upto a distance of 1 km.

25. The method according to claim 18, wherein the said probe at an increased temperature provides an increase of 6 times in the output signal over the signal at the room temperature.

26. The method according to claim 18, wherein the chemical substance that is opaque at room temperature becomes transparent at a given higher temperature enabling actuation of a relay to stop the heating process or raise an alarm.